

# **Prekindergarten classroom organization: Variation across children in the same classroom and relations to learning gains**

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## **Background**

An organized prekindergarten classroom helps children develop internal supports for their behavior and academic performance. Higher levels of classroom organization—as measured with the Classroom Assessment Scoring System (CLASS)—predict moderate gains in children’s executive functioning (EF) development and academic achievement in early childhood (Choi et al., 2016; Hamre et al., 2014; Hatfield et al., 2016; Ursache et al., 2011). It is unclear, however, which specific facets of teachers’ classroom organization (such as behavior management, directions, organized materials etc.) matter most for gains in these outcomes for children. We also have little understanding of whether a child’s experience of classroom organization differs from that of their peers. For example, similar to how differentiating academic instruction is important for children’s academic achievement (Connor et al., 2009), does differentiating behavior management or directions also predict children’s gains? If so, differentiating classroom organization might have practice implications for real-world prekindergarten contexts.

Our current study aims to help fill this gap by presenting descriptive evidence from 264 children within 39 prekindergarten classrooms and three hours of observation footage on how individual prekindergarten children experience classroom organization. We also explore linear and quadratic relations between individual children’s experiences of classroom organization and gains in EF and academic outcomes.

## **Purpose and Aims**

We adapted the Individualizing Student Instruction (ISI; Connor et al., 2009) observation system to examine children’s experiences of classroom organization. We have three aims: 1) To explore and describe the prevalence of different specific teacher organizational strategies (i.e., giving directions, behavior management; see Table 1 for full list); to investigate which specific teacher organizational strategies predict gains in child EF, language, and math outcomes; and 3) to assess whether the relation between time spent in teacher organizational strategies and gains in child outcomes is nonlinear.

## **Setting, Participants & Data Collection**

This study is part of a broader research project in the Boston Public Schools investigating the malleable school, classroom, and family factors that promote student gains from prekindergarten through third grade. In this study, 264 children across 19 schools and 39 classrooms were videotaped on two randomly-selected school days mid-year (February/March). We coded these videos using the CLASS observation system (Pianta, La Paro, & Hamre, 2008)

and the ISI observation system (Connor et al., 2009). Trained research staff assessed students on language, math, and EF skills in the fall and spring of prekindergarten using the Peabody Picture Vocabulary Test IV, Woodcock-Johnson Applied Problems, and Digit Span, respectively. Additionally, parents completed a survey in prekindergarten fall from which we drew demographic data.

### **Research Design & Analysis**

We expanded the original ISI observation measure to create more nuanced organizational strategies that teachers engage in (Table 1). To address aim 1, we calculated descriptive statistics of our key child-level classroom organization variables. To address aim 2, we fit multi-level models with random intercepts for schools, controlling for baseline demographics (specify because not listed above), time spent in unproductive non-instruction, number of minutes observed, whether students only had one observation, the percentage of observed time spent in whole class instruction, and children's baseline scores. We fit all models with conceptual blocks consisting of child- and parent-level covariates. We used these models to examine whether 1) teacher organizational strategies as a broader construct predicted gains in receptive vocabulary, math, and EF across prekindergarten, and 2) individual teacher organizational strategies (separating the construct) predicted gains in these outcomes. For aim 3, we added a quadratic term for total organizational strategies to assess the existence of a non-linear association between teacher organizational strategies (broader construct) and gains in child outcomes.

### **Results & Discussion**

For aim 1, we found that students spent an average of 13% of observed class time (or 24 minutes) receiving teacher organizational instructions, with the majority of that time spent in providing verbal directions (planning-directions; Table 2). We found variation in individual children's experience with teacher organization *within* classrooms. On average, children differed about four minutes (1.76%) from their individual classroom mean time receiving teacher organization (range: one minute (.5%) to twelve minutes (5.8%)).

Regarding aim 2, our broader construct of teacher organization did not predict gains in any outcomes. However, with specific teacher organization strategies, an increase of 1% of class time spent in planning ritual (~two minutes) was associated with a 2.2 point decrease in receptive vocabulary (Table 3, Column 3). A 1% increase of class time spent (~two minutes) in planning-modeling was associated with a 0.3 point increase in math (Table 4, Column 3), perhaps because of the emphasis in this strategy on use of manipulatives. None of the organizational strategies predicted gains in EF. For aim 3, we found a statistically significant negative quadratic relation between total teacher organizational strategies and children's receptive vocabulary that was stable across conceptual covariate blocks (Table 5). Excessive time spent orienting children to activities may have actually began to take time away from academic instruction and/or time for child talk.

In ancillary analysis, we found that the CLASS global organization score did not predict gains in any examined child outcomes. Key results for aims 2 and 3 were robust to controlling for scores on the CLASS classroom organization component.

Taken together, our exploratory study offers new evidence on prekindergarten classroom organization at the child level and suggests that some strategies may be more supportive of gains

in children's academic skills than others. Our findings also represent a step forward in meeting calls in the field for new measures that can pinpoint the specific practices in prekindergarten that promote children's gains than existing global measures (Weiland, 2018; Zaslow, Burchinal, Tarullo, & Martinez-Beck, 2016). The next generation of measures will hopefully build on this success while also pinpointing the specific practices that promote child gains in preschool.

## References

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Table 1. *Description of teacher organizational strategies*

<p><b>Planning- Directions</b></p> <p>Directions for an upcoming activity</p> <p>Prefacing an activity to orient children</p> <p>Previewing the schedule</p>	<p><i>When you get to your desk, I want you to take out a pencil and your workbook</i></p> <p><i>Remember last week when we read the Three Little Pigs? Well today we are going to read another Three Little Pigs book, but from the perspective of the wolf.</i></p> <p><i>Today we have a busy schedule. First, we have literacy centers, then we have read aloud, and then we will have a break for snack...</i></p>
<p><b>Planning- Modeling</b></p> <p>Modeling an instructional activity</p> <p>Modeling suggestions for circle time</p> <p>Modeling transitions</p>	<p><i>“I’m going to show you how to play the number bingo game. You roll the die like this...”(teacher walks students through the steps of the game)</i></p> <p><i>“At the pretend play area we have a veterinarian clinic where you can weigh your animal like this (teacher models), and then check its temperature like this (teacher models)”</i></p> <p><i>“Watch me. I want you to get up from the carpet like this and put your paper in the basket here, and then you are going to grab your activity bucket and bring it to your table like this. Got it?”</i></p>
<p><b>Planning- Behavior</b></p> <p>Commenting on good behavior</p> <p>Proactively providing behavior expectations and reminders</p>	<p><i>“I like the way Jack is sitting, I like the way Katie is sitting...”</i></p> <p><i>“I want you to walk over to your tables quietly and not talk to your neighbors when you sit down. Remember we don’t touch the</i></p>

<p>Responding to poor behavior and reorienting</p>	<p><i>materials until I say so, ok? Even if they look fun to play with.”</i></p> <p><i>“I’m going to wait for everyone to quiet down before I begin reading the story. I need everyone to sit crisscross applesauce and eyes on me.”</i></p>
<p><b>Planning- Ritual</b></p> <p>Teacher verbal chant, action, or sound that signals students to orient their attention towards the teacher, refocus, or attend to a specific task</p> <p>Movement, song, or other ritualistic activity that signals a transition to a new activity and/or helps orient children’s attention and mindset to a new activity</p>	<p><i>“1,2,3 eyes on me” (students: “1,2, eyes on you”)</i></p> <p><i>*bell sound* signaling students to quiet down or begin cleaning up</i></p> <p><i>*clap, clap, clapclapclap* (students repeat)</i></p> <p><i>A short song or movement sequence that students know to engage in when they finish transitioning e.g., (hands on their head when they sit on the carpet)</i></p>

Note. Teacher organizational strategies as a broader construct was the sum of the four “planning” behaviors above.

Table 2

*Demographic Information for Study Sample and Child Achievement Descriptive Statistics.*

Characteristic	Mean	SD
<i>Child characteristics</i>		
<u>Race/ethnicity</u>		
Hispanic	0.30	-
White	0.28	-
Black	0.17	-
Asian	0.17	-
Other race	0.08	-
Female	0.52	-
Eligible for free/reduced-lunch	0.57	-
Dual language learner	0.55	-
Child age at baseline	4.66	0.29
<u>Fall of PreK achievement measures</u>		
PPVT raw	73.95	27.52
WAP raw	12.67	5.01
Digit span	3.61	1.86
<u>Spring of PreK achievement measures</u>		
PPVT raw	87.24	26.70
WAP raw	15.89	4.48
Digit span	5.46	0.60
<i>ISI measures (child level)</i>		
Minutes observed	189.42	59.72
One observation	0.15	-
Time in whole class instruction	0.42	0.14
Teacher organizational strategies total	0.13	0.05
Planning-direction	0.09	0.04
Planning-modeling	0.01	0.02
Planning-behavior	0.01	0.02
Planning-ritual	0.01	0.01
Unproductive non-instruction	0.06	0.03
<i>Global organization (classroom level)</i>		
CLASS	5.46	0.60
<i>Parent characteristics</i>		
<u>Parent education</u>		
High school diploma/GED or less	0.31	-
Two-year degree or equivalent	0.23	-
Four-year degree	0.16	-
Advanced degree	0.29	-
At least one parent works 35 hours per week	0.89	-
At least one parent attended Head Start or PreK	0.55	-
Age of mother at first child's birth	27.76	6.99
Number of people living in household	4.27	1.24
Parents are married/have a partner	.70	-
Parent respondent age at baseline	36.76	7.07

Mother was respondent	0.85	-
Father was respondent	0.13	-

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Notes:  $N=264$ . With the exception of minutes observed, ISI measures operationalized as percentage of time observed. Unproductive non-instruction composed mainly of off-task behavior.



Table 3.

*Relations between Productive Non-Instruction Types and Gains in Receptive Vocabulary (PPVT raw).*

	(1)	(2)	(3)
Planning Direction	0.03 (0.32)	0.01 (0.32)	-0.10 (0.33)
Planning Modeling	0.06 (0.62)	0.35 (0.66)	0.09 (0.70)
Planning Behavior	1.06 (0.80)	1.32 (0.83)	1.36 (0.85)
Planning Ritual	-1.69 (1.08)	-1.83 (1.14)	-2.16*
Child-level covariates		X	X
Parent-level covariates			X

Notes: Standard errors in parentheses.  $N=226$ . Statistical significance levels are indicated as \*\*\*=1 percent, \*\*=5 percent, \*=10 percent. Models fit controlling for other productive non-instruction codes.

Table 4.

*Relationship between Productive Non-Instruction Types and Gains in Math (WAP raw).*

	(1)	(2)	(3)
Planning Direction	-0.04 (0.06)	-0.04 (0.06)	-0.03 (0.06)
Planning Modeling	0.17 (0.12)	0.22* (0.12)	0.25** (0.13)
Planning Behavior	0.02 (0.15)	0.05 (0.15)	0.13 (0.16)
Planning Ritual	-0.18 (0.21)	-0.22 (0.22)	-0.23 (0.22)
Child-level covariates		X	X
Parent-level covariates			X

Notes: Standard errors in parentheses.  $N=226$ . Statistical significance levels are indicated as \*\*\*=1 percent, \*\*=5 percent, \*=10 percent. Models fit controlling for other productive non-instruction codes.

Table 5.

*Quadratic Relationship between Productive Non-Instruction and Gains in Receptive Vocabulary (PPVT raw).*

	(1)	(2)	(3)
Total organization	1.64** (0.83)	1.90** (0.86)	1.70* (0.88)
Total organization <sup>2</sup>	-0.05** (0.03)	-0.06** (0.03)	-0.06** (0.03)
Child-level covariates		X	X
Parent-level covariates			X

Notes: Standard errors in parentheses.  $N=226$ . Statistical significance levels are indicated as \*\*\*=1 percent, \*\*=5 percent, \*=10 percent. Models fit controlling for unproductive non-instruction.